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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/802,191	YANG, XUGUANG	
	Examiner	Art Unit	
	THOMAS RICHARDSON	2144	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _24 April 2008_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1 and 3-29_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1 and 3-29_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claims 1 and 3-29 are pending for examination.

Claim 2 in cancelled.

Claim 29 is added.

Claims 1, 3, 6, 10, 14, 17-19, and 26 are amended.

Claims 1 and 3-29 are rejected.

Response to Arguments

Applicant's arguments with respect to claims 1 and 3-29 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

Claim 17 was rejected under the second paragraph of 35 U.S.C 112 for lack of antecedent basis. Claim has been amended, and the rejection is therefore withdrawn.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1 and 3-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6 671 703, Thompson et al and US 7 103 779, Kiehtreiber et al.

4. As per claim 1, Thompson teaches a generator of difference information, the generator comprising:

a first stream of information, the first stream comprising a plurality of first bytes of data (column 3, lines 34-37, where the server compares an original file to a revision of the file);

a second stream of information, the second stream comprising a plurality of second bytes of data (column 3, lines 34-37, where the server compares an original file to a revision of the file); and

an array storing operations for encoding of the first and second streams of information, wherein the generator simultaneously traverses the first and second streams of information, analyzes the plurality of first and second bytes of data encountered in the first and second streams of information, determines difference information between the first and second streams of information, and outputs the difference information between the first and second streams of information, and a plurality of operators represented by variable length codes based on a frequency of occurrence of the associated operations (column 3, lines 42-57, where the method compares bytes in both files, determining if there is a mismatch, and in that case using a token to sync the files, where the token varies based on the differences between the

two streams, also column 3, lines 35-43, where the server generates a delta file that shows the differences between the two files).

Thompson does not expressly teach the use of a hierarchical tree encoding scheme.

Kiehtreiber teaches a method for incremental code signing comprising:

a hierarchical tree encoding structure (Figures 3 and 4, also column 4, line 58 to column 5, line 7, where a program is broken into pages and a hash value is computed for each memory page, then another value is computed for the entire program based on the individual values).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the hierarchical tree encoding method as taught by Kiehtreiber in a stream comparator such as that taught by Thompson. Kiehtreiber's system is directed toward piecewise authentication of a program for greater security in transmission over the internet (column 1, lines 12-19). It further allows large programs to be quickly and easily authenticated (column 1, lines 65-66). This would be beneficial in any system for transferring information over the internet, especially that of Thompson, as the streams could be verified in pieces as well as over the whole document. In addition, the hash values may be used as a comparison of the stream, further reducing the amount of processing required to generate difference information.

5. As per claim 3, Thompson further teaches that the differencing instruction set comprises at least one operation selected from a match operation, an insert operation, a delete operation, and a replace operation (column 3, lines 48-57, where the sync determines if there was an insert, delete, or replace action taken on the file).

6. As per claim 4, Kiehtreiber further teaches an encoder providing tree-based encoding, the encoder employing a block-based hierarchical representation, and the encoder segmenting blocks during encoding (Figures 3 and 4, also column 4, line 58 to column 5, line 7, where a program is broken into pages and a hash value is computed for each memory page, then another value is computed for the entire program based on the individual values).

7. As per claim 5, Kiehtreiber further teaches the encoder employs variable length encoding techniques for operators in a ser of operations, and the encoder employing tree-based variable sized blocks (column 4, lines 65-67, where many different sizes of hash values may be used for each block).

Thompson further teaches that the generator computes a cumulative address offset (column 3, lines 43-46, where a skip count is generated and used to skip bytes).

8. As per claim 6, Thompson teaches an electronic device network adapted to dispense streaming updates to at least one of a plurality of electronic devices, the updates for updating one of firmware and software (column 3, lines 17-32, where the server updates a file at a remote client), the electronic device network comprising:

a generator generating streaming updates, the generator processing at least one of a plurality of blocks of content, the at least one of a plurality of blocks of content comprising a stream of bytes, the generator processing the at least one of a plurality of blocks of content until reaching an end of the stream of bytes (column 3, lines 32-38, where the server compares an original file to a revised file);

a server communicatively coupled to the at least one of a plurality of electronic devices, the server disseminating the streaming updates to the at least one of a plurality of electronic devices (Figure 1, where the server 14 distributes the updated information); and

a processor in the at least one of a plurality of electronic devices for processing the streaming updates received from the server (Figure 1, where the clients are computers, therefore have processors).

Thompson does not expressly teach the use of a hierarchical tree encoding scheme. Kiehtreiber teaches a method for incremental code signing comprising:

a hierarchical tree encoding structure (Figures 3 and 4, also column 4, line 58 to column 5, line 7, where a program is broken into pages and a hash value is computed for each memory page, then another value is computed for the entire program based on the individual values).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the hierarchical tree encoding method as taught by Kiehtreiber in a stream comparator such as that taught by Thompson. Kiehtreiber's system is directed toward piecewise authentication of a program for greater security in transmission over the internet (column 1, lines 12-19). It further allows large programs to be quickly and easily authenticated (column 1, lines 65-66). This would be beneficial in any system for transferring information over the internet, especially that of Thompson, as the streams could be verified in pieces as well as over the whole document. In addition, the hash

values may be used as a comparison of the stream, further reducing the amount of processing required to generate difference information.

9. As per claim 7, Thompson further teaches the generator employs an array to store operations used to transform a first stream of information into a second stream of information (Figure 2, where the server contains a memory with the file difference synchronization system), the generator processing the first stream and the second stream in a byte-by-byte fashion to generate streaming updates (column 3, lines 42-57, where the method compares bytes in both files, determining if there is a mismatch, and in that case using a token to sync the files), and each byte is one of a text character and a binary value of at least one of the first and second streams (column 3, lines 42-57, where the method compares bytes in both files, determining if there is a mismatch, and in that case using a token to sync the files. It is well known in the art that bytes in a computer system are made up of binary bits).

10. As per claim 8, Thompson further teaches the generator maintains a transform array wherein a minimum weight is assigned to a set of operations, the minimum weight being computed by employing an edit distance computation in management of an operational array (column 8, lines 42-47, where a traversal routine is run computing the least cost path to a node).

11. As per claim 9, Thompson further teaches the set of operations comprises at least one of a replace operation, a match operation, an insert operation, and a delete operation (column 8, lines 48-60, where the traversal routine is for a delete action).

12. As per claim 10, Kiehtreiber further teaches a tree-based hierarchy employed by the encoder comprising at least three levels for encoding a block of N operation, the hierarchy comprising a top level wherein each node of the top level encodes N bytes, a second level wherein each node of the second level encodes N/4 bytes, and a third level wherein each node of the third level encodes N/16 bytes (Figures 3 and 4, also column 4, line 58 to column 5, line 7, where a program is broken into pages and a hash value is computed for each memory page, then another value is computed for the entire program based on the individual hash values. The encoding therefore uses a three level encoding scheme, where the program/page, then page hash value, then array hash value, where each is smaller than the previous. The use of any specific fraction would thus be obvious, as the hash values are dependent on the encoding scheme, as stated column 4, lines 65-67).

13. As per claim 11, Thompson further teaches the encoder assigns a minimum weight, wherein the minimum weight is computed by employing appropriate weights in management of a transform array (column 8, lines 42-47, where a traversal routine is run computing the least cost path to a node).

14. As per claim 12, Thompson further teaches the encoder assigns numeric values to each operation in the set of operations, wherein non-zero values are assigned to replace operators and insert operators, and zero is assigned to match operators (column 3, lines 42-57, where a token's worth of bytes are grabbed from the file. Thus, if an insert, delete or replace function has taken place, the token will have a value. If the

bytes match and the skip function is utilized, no token is present, and the value of the nonexistent token is therefore zero).

15. As per claim 13, Thompson further teaches the electronic device network is one of a wired and a wireless network (Figure 1, where the server communicated with remote devices on a wired or wireless network, those devices being a desktop, laptop, and PDA).

16. As per claim 14, Thompson further teaches the streaming updates comprise a difference output for two streams comprising one of binary data and text data (column 3, lines 34-38, where the server sends a delta modification file to a remote device for updates), the difference output comprising a tree map, comprising operational codes for operations comprising at least one of a replace operation, a match operation, a delete operation, and an insert operation (column 4, lines 1-5, where the operations are skip, delete, insert, and replace, also Fig. 3B and column 7, lines 33-58, where if an operation is found for a node or region of data blocks, that operation is performed on the node or region based on the operational code), and data characters associated with at least one of the insert operation and the replace operation (column 3, lines 45-57, where a token associated with the operations is grabbed).

17. As per claim 15, Kiehtreiber further teaches a stream of information is processed by the generator, and wherein an operational array is computed in the generator by consuming each of the streams in small chunks, wherein a small chunk comprises one of a 64-byte block of information, a 16-byte block of information, and a 4-byte block of information (Figures 3 and 4, also column 4, line 58 to column 5, line 7, where a

program is broken into pages and a hash value is computed for each memory page, then another value is computed for the entire program based on the individual hash values. The encoding therefore uses a three level encoding scheme, where the program/page, then page hash value, then array hash value, where each is smaller than the previous. The use of any specific fraction would thus be obvious, as the hash values are dependent on the encoding scheme, as stated column 4, lines 65-67).

18. As per claim 16, Thompson further teaches the after the server defines an operation, it reorients to a corresponding point in each of the streams to start additional encoding of a next small chunk (column 4, lines 6-17, where the server reorients according to the byte offset presented with each action).

19. As per claim 17, Thompson further teaches wherein the electronic device comprises at least one of a plurality of mobile electronic devices, and wherein the plurality of mobile electronic devices comprise at least one of a mobile cellular phone handset, a personal digital assistant, a pager, a multimedia device, and a camera (Figure 1, where a remote client is a PDA).

20. As per claim 18, Thompson teaches a method of generating streaming updates by converting a first stream of information into a second stream of information for updating an electronic device, the method comprising:

identifying the first and second streams of information (Figure 2, where the original file and revision file represent the two streams of information);

accessing the first and second streams of information (column 3, lines 32-42, where the first and second streams are compared to create a delta modification file);

retrieving one block of content at a time from each of the first and the second streams of information (column 3, lines 42-46, where the server goes through the files byte by byte);

determining a transform operation (column 3, lines 32-42, where the first and second streams are compared to create a delta modification file);

executing the transform operation (column 3, lines 32-42, where the first and second streams are compared to create a delta modification file); and

computing an output from the transform operation (column 3, lines 32-42, where the first and second streams are compared to create a delta modification file).

Thompson does not expressly teach the use of a hierarchical tree encoding scheme. Kiehtreiber teaches a method for incremental code signing comprising:

a tree-based hierarchy employed by the encoder comprising at least three levels for encoding a block of N operation, the hierarchy comprising a top level wherein each node of the top level encodes N bytes, a second level wherein each node of the second level encodes N/4 bytes, and a third level wherein each node of the third level encodes N/16 bytes (Figures 3 and 4, also column 4, line 58 to column 5, line 7, where a program is broken into pages and a hash value is computed for each memory page, then another value is computed for the entire program based on the individual hash values. The encoding therefore uses a three level encoding scheme, where the program/page, then page hash value, then array hash value, where each is smaller than the previous. The use of any specific fraction would thus be obvious, as the hash values are dependent on the encoding scheme, as stated column 4, lines 65-67).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the hierarchical tree encoding method as taught by Kiehtreiber in a stream comparator such as that taught by Thompson. Kiehtreiber's system is directed toward piecewise authentication of a program for greater security in transmission over the internet (column 1, lines 12-19). It further allows large programs to be quickly and easily authenticated (column 1, lines 65-66). This would be beneficial in any system for transferring information over the internet, especially that of Thompson, as the streams could be verified in pieces as well as over the whole document. In addition, the hash values may be used as a comparison of the stream, further reducing the amount of processing required to generate difference information.

21. As per claim 19, Kiehtreiber further teaches encoding the hierarchical tree-based transform output employing at least one of variable length encoding and fixed length encoding (Figures 3 and 4, also column 4, line 58 to column 5, line 7, where a program is broken into pages and a hash value is computed for each memory page, then another value is computed for the entire program based on the individual values); and

outputting the information into at least one memory structure (Figures 3 and 4, also column 4, line 58 to column 5, line 7, where a program is broken into pages and a hash value is computed for each memory page, then another value is computed for the entire program based on the individual values, where the values must be stored in a memory to be transmitted over the internet).

22. As per claim 20, Thompson further teaches:

determining whether additional blocks of content are to be processed by evaluating the first and second streams of information (column 6, lines 46-54, where the file difference synchronization continues until and end of file (EOF) is reached);

retrieving an additional block of content from each of the first and the second streams of information upon determining that additional blocks of content are to be encoded (column 6, lines 46-54, where the file difference synchronization continues if no end of file (EOF) is reached); and

continuing encoding until reaching an end of a stream of blocks of content to be encoded (column 6, lines 46-54, where the file difference synchronization continues until and end of file (EOF) is reached).

23. As per claim 21, Thompson further teaches:

compressing difference information output (column 3, lines 36-42, where the server generates a delta modification file, which gives the only the difference information, not the entire modified file); and

packaging the difference information output into an update (column 3, lines 36-42, where the delta modification file is transmitted to the remote user).

24. As per claim 22, Thompson further teaches:

buffering content from the first stream of information and the second stream information to determine the difference information (Figure 2, where both the original and revision files are stored in the server memory); and

outputting the difference information (column 3, lines 35-42, where the delta modification file is generated by the server and sent to the remote user)

25. As per claim 23, Thompson further teaches the update facilitates conversion of the first stream of information into the second stream of information, wherein retrieving blocks of content from the second stream of information is performed at a fixed pace using a fixed block size, and wherein retrieving blocks of content from the first stream of information is performed at a variable pace using a variable block size, wherein a reference to the second stream of information is maintained and a cumulative offset is computed (column 3, lines 42-57, where the system compares bytes from each data string. It would have been obvious and well-known in the art to employ multiple methods of retrieving and processing data in the streams. The data residing in the memory may be processed at any pace, and one skilled in the art would have found it obvious to use any combination of block size and retrieval speeds).

26. As per claim 24, Thompson further teaches a look-ahead operation is executed as part of retrieving blocks of content, the look-ahead operation employing data from the first and second streams of information to compute an operational array (column 3, lines 43-57, where the method will continue counting matching bytes until there is a mismatch, and does not perform an action until matching information for the next byte is determined).

27. As per claim 25, Thompson further teaches a longest common sub-string technique is employed prior to determining a transform operation (column 3, lines 43-57, where the method will continue counting matching bytes until there is a mismatch, then begin taking tokens and employing differentiation methods).

28. As per claim 26, Thompson further teaches encoding a node and sub-nodes in a way indicating an impossible difference is employed as an escape sequence during encoding (column 3, lines 43-46, where a skip count is generated and used to skip bytes. It would have been obvious to one of ordinary skill in the art that the skip count may provide an escape sequence. The skip count of a full block, sequence, or stream to announce that there does not need to be further processing, and then would supply the same functionality as the escape sequence as defined in the specification).

29. As per claim 27, Thompson further teaches a combination of the escape sequence, a type field of two bits, and a length representing a repetition of data associated with the type field is employed by to encode long strings of complete matches between the first and second streams of information (column 4, lines 1-17, where the skip record shows the number of bytes that are matches between the first and second strings).

30. As per claim 28, Thompson further teaches the electronic device comprises at least one of a plurality of mobile electronic devices, and wherein the plurality of mobile electronic devices comprise at least one of a mobile cellular phone handset, a personal digital assistant, a pager, a multimedia device, and a camera (Figure 1, where the remote devices are a desktop, laptop, and PDA).

31. As per claim 29, Kiehtreiber further teaches a tree-based hierarchy employed by the encoder comprising at least three levels for encoding a block of N operation, the hierarchy comprising a top level wherein each node of the top level encodes N bytes, a second level wherein each node of the second level encodes N/4 bytes, and a third

level wherein each node of the third level encodes N/16 bytes (Figures 3 and 4, also column 4, line 58 to column 5, line 7, where a program is broken into pages and a hash value is computed for each memory page, then another value is computed for the entire program based on the individual hash values. The encoding therefore uses a three level encoding scheme, where the program/page, then page hash value, then array hash value, where each is smaller than the previous. The use of any specific fraction would thus be obvious, as the hash values are dependent on the encoding scheme, as stated column 4, lines 65-67).

Conclusion

32. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

33. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 7 324 514, Haq et al teaches implementing access control lists using a balanced hash table of comparison trees.

US 6 032 216, US 5 987 477, US 5 950 199, US 5 946 686, Schmuck et al teaches a parallel file system with using tokens for locking modes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS RICHARDSON whose telephone number is (571) 270-1191. The examiner can normally be reached on Monday through Thursday, 8am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Vaughn can be reached on (571) 272-3922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Glenton B. Burgess/
Supervisory Patent Examiner, Art Unit 2153

TR
6/2/2008